The electric field can be controlled by a microprocessor to create a matrix having a desired geometry. The target and the electroprocessing nozzle or nozzles can be movable with respect to each other and to the target thereby allowing additional control over the geometry of the electroprocessed material to be formed. In embodiments in which substances are electroprocessed, this manipulation will also allow control of the distribution of substances within the electroprocessed materials. For example a matrix can be prepared on a mandrel, and substances from a separate reservoir can be sprayed, dripped, electroprocessed in a specific pattern over the existing matrix. This may also be accomplished by simultaneously electrospraying a matrix from one source and a substance from another source. In this example the matrix source may be stationary and the substance source is moved with respect to the target mandrel.

Other features that allow establishment of such a pattern include, but are not limited to, the ability to deposit multiple layers of the same or different materials, combining different electroprocessing methods, the use multiple orifices with different contents for electroprocessing, and the existence of numerous methods for combining substances with the materials. For example, a gradient of substances can be created along a electroprocessed material. In embodiments in which the matrix is shaped into a cylindrical construct, for example, the gradient can be prepared along the long axis of a construct (left to right) or the perpendicular axis (inside to out). This configuration is used to provide a chemoattractant gradient to guide the movement of cells within a specified site. Thus, for example, in some embodiments in which neovascular agents are prepared in a perpendicular gradient along a collagen-based construct, the agents can be concentrated on the dorsal surface of a sheet of the material. The ventral side can be placed against a wound and the higher concentration of angiogenic materials on the dorsal surface of the construct will increase the migration of endothelial cells through the electrospun material. Again, embodiments with complex patterns can use a microprocessor programmed with the specific parameters to obtain a specific, preselected electroprocessed pattern of one or more electroprocessed polymers, optionally with one or more substances.

Uses for the Compositions of the Present Invention

Substance delivery

One use of the compositions of the present invention is the delivery of one or more substances to a desired location. In some embodiments, the electroprocessed materials are used simply to deliver the materials itself. In other embodiments, the electroprocessed materials are used to deliver substances that are contained in the electroprocessed material or that are produced or released by substances contained in the electroprocessed material. For example, an electroprocessed material containing cells can be implanted in a body and used to deliver molecules produced by the cells after implantation. The present compositions can be used to deliver substances to an *in vivo* location, an *in vitro* location, or other locations. The present compositions can be administered to these locations using any method.

In the field of substance delivery, the compositions of the present invention have many attributes that allow delivery of substances using a wide variety of release profiles and release kinetics. For example, selection of the substance and the method by which the substance is combined with the electroprocessed material affects the substance release profile. To the extent that the substances are not immobilized by the electroprocessed material, release from the electroprocessed material is a function of diffusion. An example of such an embodiment is one in which the substance is sprayed onto the electroprocessed material. To the extent that the substances are immobilized by the electroprocessed material, release rate is more closely related to the rate at which the electroprocessed material degrades. An example of such an embodiment is one in which the substance is covalently bonded to the electroprocessed material. For a substance is trapped within an electrospun aggregate or filament, release kinetics would be determined by the rate at which the surrounding material degrades or disintegrates. Still other examples are substances that are coupled to the electroprocessed material by a light sensitive bond. Exposing such a bond to light releases the substance from the electroprocessed material. Conversely, in some embodiments of this invention, materials can be exposed to light to cause binding of agents in vivo or in vitro. Combining the compound with the electroprocessed material in solution, rather than in suspension, will result in a different pattern of release and thereby provide yet another level of control for the process. Further, the porosity of the electroprocessed material can be regulated,

which affects the rate of release of a substance. Enhanced porosity facilitates release. Substance release is also enhanced by fragmenting or pulverizing the electroprocessed material. Pulverized material can, for example be applied to a wound site, ingested or formed into another shape such as a capsule or a tablet. In embodiments in which the substance is present in the form of a large particle such as a tablet encapsulated in the electroprocessed material or a molecule trapped inside an electroprocessed filament, release is dictated by a complex interplay of the rate the particles dissolve or degrade and any breakdown or degradation of the electroprocessed material structure. In embodiments in which the substance comprises cells that will express one or more desired compounds, factors that affect the function and viability of the cells and the timing, intensity, and duration of expression can all affect the release kinetics. Chemicals that affect cell function, such as oligonucleotides, promoters or inhibitors of cell adhesion, hormones, and growth factors, for example, can be incorporated into the electroprocessed material and the release of those substances from the electroprocessed material can provide a means of controlling expression or other functions of cells in the electroprocessed material.

Release kinetics in some embodiments are manipulated by cross-linking electroprocessed material through any means. In some embodiments, cross-linking will alter, for example, the rate at which the electroprocessed material degrades or the rate at which a compound is released from the electroprocessed material by increasing structural rigidity and delaying subsequent dissolution of the electroprocessed material. Electroprocessed materials can be formed in the presence of cross-linking agents or can be treated with cross-linking agents after electrodeposition. Any technique for cross-linking materials may be used as known to one of ordinary skill in the art Examples of techniques include application of cross-linking agents and application of certain cross-linking radiations. Examples of cross-linking agents that work with one or more proteins include but are not limited to condensing agents such as aldehydes e.g., glutaraldehyde, carbodiimide EDC (1-ethyl-3(3 dimethyl aminopropyl)), photosensitive materials that cross link upon exposure to specific wavelengths of light, osmium tetroxide, carbodiimide hydrochloride, and NHS (n-hydroxysuccinimide), and Factor XIIIa. Ultraviolet radiation is one example of radiation used to crosslink matrix materials in some embodiments. Natural materials can be cross-linked with other natural materials. For example, collagen